MASTER OF COMPUTER APPLICATIONS R23

SEMESTER - III

S.No.	Course code	Course Name	Hours per Week			Credits
			L	T	P	
1.	23MCT301	Web Technologies	4	0	0	4
2.	23MCT302	Big Data Technologies	4	0	0	4
3.	23MCT303	Dev Ops & Agile Programming	4	0	0	4
4.	23MCT304a 23MCT304b 23MCT304c	Program Elective - II Software Architecture & DesignPatterns Network Security Machine Learning	3	0	0	3
5.	23MCT305a 23MCT305b 23MCT305c	Program Elective - III Mobile Application Development Internet of things Block chain Technologies	3	0	0	3
6.	23MCP301	Web Technologies Laboratory	0	1	2	2
7.	23MCP302	Big Data Technologies Laboratory	0	1	2	2
8.	23MCP303	Dev Ops& Agile Programming Laboratory	0	1	2	2
9.	23MCP304	Summer Internship / Industry Oriented Mini Project/ Skill Development Course (Minimum 6 weeks)	-	-	-	2
10.	23MCP305	Skill oriented Course - II Full Stack Development	1	0	2	2
Total			19	3	8	28

SEMESTER - IV

S.No.	Course code	Course Name	Hours per Week			Credits
			L	T	P	
1.	23MCT401a 23MCT401b 23MCT401c	Program Elective- IV Deep Learning Social Media Analysis MultimediaSystems and Tools	3	0	0	3
2.	23MCT402a 23MCT402b 23MCT402c	Open Elective - II Cyber Laws Entrepreneurship NOSQL Databases	3	0	0	3
3.	23MCP401	Project Work	0	0	20	10
4.	23MCP402	Comprehensive Viva Voce	-	-	-	2
Total			6	0	20	18

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Course Code	WEB TECHNOLOGIES	L	T	P	C
23MCT301		4	0	0	4
Semester				III	

Course Objectives:

1. To introduce PHP language for server-side scripting
2. To introduce XML and processing of XML Data with Java
3. To introduce Server-side programming with Java Servlets and JSP
4. To introduce Client-side scripting with Javascript and AJAX.

Course Outcomes (CO):

After completion of the course, student will be able to,

CO1: Gain knowledge of client-side scripting, validation of forms and AJAXprogramming
CO2: Understand server-side scripting with PHP language
CO3: Understand what is XML and how to parse and use XML Data with Java
CO4: To introduce Server-side programming with Java Servlets and JSP
CO5: Understand what is HTML and how to apply cascading style sheets to web pages

UNIT-I	Lecture Hrs:10

Introduction to PHP: Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, reading data from web form controls like text boxes, radio buttons, lists etc., Handling File Uploads. Connecting to database (MySQLas reference), executing simple queries, handling results, Handling sessions and cookies File Handling in PHP: File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories.

UNIT-II	Lecture Hrs:10

HTML Common tags- List, Tables, images, forms, Frames; Cascading Style sheets; XML: Introduction to XML, Defining XML tags, their attributes and values, DocumentType Definition, XML Schemes, Document Object Model, XHTML Parsing XML Data - DOM and SAX Parsers in java.

UNIT III	Lecture Hrs:10

Introduction to Servlets: Common Gateway Interface (CGt), Life cycle of a Servlet, deploying a servlet, The Servlet API, Reading Servlet parameters, Reading Initialization parameters, Handling Http Request & Responses, Using Cookies and Sessions, connecting to a database using JDBC.

UNIT IV	Lecture Hrs:10

Introduction to JSP: The Anatomy of a JSP Page, JSP Processing, Declarations, Directives, Expressions, Code Snippets, implicit objects, Using Beans in JSP Pages, Using Cookies and session for session tracking, connecting to database in JSP.

UNIT V	Lecture Hrs:10

Client-side Scripting: Introduction to JavaScript, JavaScript language - declaring variables, scope of variables, functions. event handlers (on click, on submit etc.), Document Object Model, Form validation.

Text Books:

1. Web Technologies, Uttam K Roy, Oxford University Press.
2. The Complete Reference PHP - Steven Holzner, Tata McGraw-Hill.

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Course Code	BIG DATA TECHNOLOGIES	L	T	P	C
23MCT302		4	0	0	4
Semester				III	

Course Objectives:

1. To understand the specialized aspects of big data including big data application, and big data analytics.
2. To study different types Case studies on the current research and applications of the Hadoop and big data in industry.

Course Outcomes (CO):

After completion of the course, student will be able to,

CO1: Discuss the challenges and their solutions in Big Data.

CO2: Understand and work on Hadoop Framework and eco systems.

CO3: Explain and Analyze the Big Data using Map-reduce programming in bothHadoop and Spark framework.

CO4: Demonstrate spark programming with different programming languages.

CO5: Demonstrate the graph algorithms and live streaming data in Spark.

UNIT-I	Lecture Hrs:12

What is big data, why big data, convergence of key trends, unstructured data, industry examples of big data, web analytics, big data and marketing, fraud and big data, risk and big data, credit risk management, big data and algorithmic trading, big data and healthcare, big data in medicine, advertising and big data, big data technologies, introduction to Hadoop, open source technologies, cloud and big data, mobile business intelligence, Crowd sourcing analytics, inter and trans firewall Analytics.

UNIT-II	Lecture Hrs:12

Introduction to NoSQL, aggregate data models, aggregates, key-value and document data models, relationships, graph databases, schemaless databases, materialized views, distribution models, sharding, master-slave replication, peer-peer replication, sharding and replication.

Introduction to MongoDB: What is MongoDB? Why Mongo DB? (using JSON, Creating or generating a unique key, Support for Dynamic Queries, Storing Binary Data, Replication, Shading, updating information in –place), Terms used in RDBMS and Mongo DB, Data types in Mongo DB, MongoDB Query Language.

UNIT III	Lecture Hrs:12

Data format, analyzing data with Hadoop, scaling out, Hadoop streaming, Hadooppipes, design of Hadoop distributed file system (HDFS), HDFS concepts, Java interface, data flow, Hadoop 1/0, data integrity, compression, serialization, Avro, file-based data structures.

UNIT IV	Lecture Hrs:8

MapReduce workflows, unit tests with MRUnit, test data and local tests, anatomy of MapReduce job run, classic Map-reduce, YARN, failures in classic Map-reduce and YARN, job scheduling, shuffle and sort, task execution, MapReduce types, input formats, output formats.

UNIT V	Lecture Hrs:8

Hbase, data model and implementations, Hbase clients, Hbase examples, praxis.Cassandra, Cassandra data model, Cassandra examples, Cassandra clients, Hadoop integration, Hive, data types and file formats, HiveQL data definition, HiveQL data manipulation, HiveQL

queries.

Text Books:

1. Big Data Analytics, Introduction to Hadoop, Spark, and Machine-Learning, Raj kamal, Preeti Saxena, McGraw Hill, 2018.
2. Big Data, Big Analytics: Emerging Business intelligence and Analytic trends for Today's Business, Michael Minelli, Michelle Chambers, and Ambiga Dhiraj, John Wiley& Sons, 2013.

MASTER OF COMPUTER APPLICATIONS R23

Course Code	DEVOPS & AGILE PROGRAMMING	L	T	P	C
23MCT303		4	0	0	4
Semester				III	

Course Objectives:

1. To give strong knowledge of Agile practices
2. To give strong foundation of applications of DevOps
3. To give strong foundation of development and its operations
4. To give strong foundation of the source code management

Course Outcomes (CO):

After completion of the course, student will be able to,
CO1: Understand the traditional software development
CO2: Learn the rise of agile methodologies.
CO3: Understand developing and architecture of agile.
CO4: Define and design purpose of Devops.
CO5: Understand applied Devops.

UNIT-I	Lecture Hrs:12

Why Agile?, How to be Agile, Understanding XP, Values and Principles, Improve the Process, Eliminate Waste, Deliver Value.
Practicing XP-Thinking, Pair Programming, Energized Work, Informative Workspace, Root-Cause Analysis, Retrospectives, Collaborating, Sit Together, Real Customer Involvement, Ubiquitous Language, Stand-Up Meetings, Coding Standards, Iteration Demo, Reporting.

UNIT-II	Lecture Hrs:12

Releasing-Done Done, No Bugs, Version Control, Ten-Minute Build, Continuous Integration, Collective Code Ownership, Documentation.
Planning-Vision, Release Planning, Risk Management, Iteration Planning, Stories,Estimating.

UNIT III	Lecture Hrs:10

Developing-Incremental Requirements, Customer Tests, Test- Driven Development, Refactoring, Incremental Design and Architecture, Spike Solutions, Performance Optimization.

UNIT IV	Lecture Hrs:10

DEFINITION & PURPOSE OF DEVOPS: Introduction to DevOps - DevOps and Agile, Minimum Viable Product - Application Deployment - Continuous Integration -Continuous Delivery.

UNIT V	Lecture Hrs:10

CAMS (CULTURE, AUTOMATION, MEASUREMENT AND SHARING): CAMS - Culture - CAMS - Automation - CAMS - Measurement - CAMS - Sharing - Test-Driven Development - Configuration Management - Infrastructure Automation - Root Cause Analysis - Blamelessness - Organizational Learning.

Text Books:

1. James Shore and Shane Warden," The Art of Agile Development", O'REILLY, 2007. Robert C. Martin, "Agile Software Development, Principles, Patterns, and Practices", PHI, 2002.
2. The DevOps Handbook - by Gene Kim, Jez Humble, Patrick Debois, and Willis Willis

What is DevOps? - by Mike Loukides
3. The DevOps Handbook - by John Willis, Patrick Debois, Jez Humble, Gene Kim.
4. DevOps: A Software Architect's Perspective - by Len Bass, Ingo Weber, Liming Zhu.

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Course Code	SOFTWARE ARCHITECTURE AND DESIGNPATTERNS	L	T	P	C
23MCT304a		3	0	0	3
Semester				III	

Course Objectives:

1. Learn How to add functionality to designs while minimizing complexity.
2. What code qualities are required to maintain to keep code flexible?
3. To Understand the common design patterns.
4. To explore the appropriate patterns for design problems

Course Outcomes (CO):

After completion of the course, student will be able to,

CO1: Design and implement codes with higher performance and lower complexity

CO2: Experience core design principles and be able to assess the quality of a design with respect to these principles.

CO3: Capable of applying these principles in the design of object-oriented systems.

CO4: Demonstrate an understanding of a range of design patterns. Be capable of comprehending a design presented using this vocabulary.

CO5: Be able to select and apply suitable patterns in specific contexts

UNIT-I	Lecture Hrs:12

Envisioning Architecture The Architecture Business Cycle, What is Software Architecture, Architectural patterns, reference models, reference architectures, architectural structures and views.

Creating an Architecture Quality Attributes, Achieving qualities, Architectural styles and patterns, designing the Architecture, Documenting software architectures, Reconstructing Software Architecture.

UNIT-II	Lecture Hrs:12

Analyzing Architectures Architecture Evaluation,Architecture design decision making, ATAM, CBAM.

Moving from One System to Many Software Product Lines, Building systemsfrom off the shelf components, Software architecture in future.

UNIT III	Lecture Hrs:10

Patterns Pattern Description, Organizing catalogs, role in solving design problems, Selection and usage. Creational and Structural Patterns Abstract factory, builder, factory method, prototype, singleton, adapter, bridge, composite, facade, flyweight.

UNIT IV	Lecture Hrs:10

Behavioral Patterns Chain of responsibility, command, Interpreter, iterator, mediator, memento, observer, state, strategy, template method, visitor.

UNIT V	Lecture Hrs:10

Case Studies A-7E - A case study in utilizing architectural structures, The World Wide Web - a case study in interoperability, Air Traffic Control - a case study in designing for high availability, Celsius Tech - a case study in product line development. A Case Study (Designing a Document Editor): Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel

Standards, Supporting Multiple Window Systems, User Operations, Spelling Checking and Hyphenation.

Text Books:

1. Software Architecture in Practice, second edition, Len Bass, Paul Clements & Rick Kazman, Pearson Education, 2003.
2. Design Patterns, Erich Gamma, Pearson Education, 1995

Reference Books:

1. Beyond Software architecture, Luke Hohmann, Addison wesley, 2003.
2. Software architecture, David M. Dikel, David Kane and James R. Wilson, Prentice Hall PTR, 2001
3. Software Design, David Budgen, second edition, Pearson education, 2003
4. Head First Design patterns, Eric Freeman & Elisabeth Freeman, O'REILLY, 2007.
5. Design Patterns in Java, Steven John Metsker& William C. Wake, Pearson education, 2006
6. J2EE Patterns, Deepak Alur, John Crupi& Dan Malks, Pearson education, 2003.
7. Design Patterns in C#, Steven John metsker, Pearson education, 2004.

Pattern Oriented Software Architecture, F.Buschmann& others, John Wiley & Sons.

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Course Code	NETWORK SECURITY	L	T	P	C
23MCT304b		3	0	0	3
Semester				III	

Course Objectives:

1. Network security using various cryptographic algorithms.
2. Underlying network security applications. It also focuses on the practical applications that have been implemented and are in use to provide email and web security.

Course Outcomes (CO):

After completion of the course, student will be able to,

CO1: Understand the most common type of cryptographic algorithm

CO2: Understand the Public-Key Infrastructure

CO3: Understand security protocols for protecting data on networks

CO4: Be able to digitally sign emails and files

CO5: Understand vulnerability assessments and the weakness of using passwords for authentication & be able to perform simple vulnerability assessments and password audits.

UNIT-I	Lecture Hrs:10

Attacks, Services and Mechanisms, Security Attacks, Security Services, Integrity check, digital Signature, authentication, has algorithms.

UNIT-II	Lecture Hrs:10

Block Encryption, DES rounds, S-Boxes IDEA: Overview, comparison with DES, Key expansion, IDEA rounds, Uses of Secret key Cryptography; ECB, CBC, OFB, CFB, Multiple encryptions DES.

UNIT III	Lecture Hrs:10

Length of hash, uses, algorithms (MD2, MD4, MD5, SHS) MD2: Algorithm (Padding, checksum, passes.) MD4 and 5: algorithm (padding, stages, digest computation.) SHS: Overview, padding, stages. Algorithms, examples, Modular arithmetic (addition, multiplication, inverse, and exponentiation) RSA: generating keys, encryption and decryption. Other Algorithms: PKCS, Diffie-Hellman, El-Gamal signatures, DSS, Zero-knowledge signatures.

UNIT IV	Lecture Hrs:10

Password Based, Address Based, Cryptographic Authentication. Passwords in distributed systems, on-line VS offline guessing, storing. Cryptographic Authentication: passwords as keys, protocols, KDC's Certification Revocation, Interdomain, groups, delegation. Authentication of People: Verification techniques, passwords, length of passwords, password distribution, smart cards, biometrics.

UNIT V	Lecture Hrs:10

What is security policy, high- and low level policy, user issues? Protocol problems, assumptions, Shared secret protocols, public key protocols, mutual authentication, reflection attacks, use of timestamps, nonce and sequence numbers, session keys, one-and two-way public key- b a s e d authentication.

Text Books:

1. AtulKahate, Cryptography and Network Security, McGraw Hill.
2. Kaufman, c., Perlman, R., and Speciner, M., Network Security, Private Communication in a public world, 2nd ed., Prentice HallPTR., 2002.
3. Stallings W.Cryptography and Network Security: Principles and Practice, 3rd ed.,

Prentice Hall PTR.,2003
4. Stallings, W. Network security Essentials: Applications and standards, Prentice Hall, 2000.
5. Cryptography and Network Security; McGraw Hill; Behrouz A Forouzan.
6. Information Security Intelligence Cryptographic Principles and App. CalabresThomson.
7. Securing A Wireless Network Chris Hurley SPD.

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Course Code	MACHINE LEARNING	L	T	P	C
23MCT304c		3	0	0	3
Semester				III	

Course Objectives:

1. This course explains machine learning techniques such as decision tree learning, Bayesian learning etc.
2. To understand computational learning theory.
3. To study the pattern comparison techniques..

Course Outcomes (CO):

After completion of the course, student will be able to,
CO1: Understand the concepts of computational intelligence like machine learning.
CO2: Gain knowledge on ANN
CO3: Understand Bayesian learning, Computational learning and Instance based learning.
CO4: Ability to get the skill to apply machine learning algorithms, rules on real time applications with examples..
CO5: Understand the Analytical learning and its usage in machine learning applications.

UNIT-I	Lecture Hrs:12

Introduction - Well-posed learning problems, designing a learning system, Perspectives and issues in machine learning, Concept learning and the general to specific ordering - introduction, a concept learning task, concept learning as search, find-S: finding a maximally specific hypothesis, version spaces and the candidate elimination algorithm, remarks on version spaces and candidate elimination, inductive bias.
Decision Tree Leaming - Introduction, decision tree representation, appropriate problems for decision tree learning, the basic decision tree learning algorithm, hypothesis space search in decision tree learning, inductive bias in decision tree learning, issues in decision tree learning

UNIT-II	Lecture Hrs:12

Artificial Neural Networks-I- Introduction, neural network representation, appropriate problems for neural network learning, perceptions, multilayer networks and the back-propagation algorithm.
Artificial Neural Networks-2- Remarks on the Back-Propagation algorithm, An illustrative example: face recognition, advanced topics in artificial neural networks.
Evaluation Hypotheses - Motivation, estimation hypothesis accuracy, basics of sampling theory, a general approach for deriving confidence intervals, difference in error of two hypotheses, comparing learning algorithms.

UNIT III	Lecture Hrs:10

Bayesian learning - Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum Likelihood and least squared error hypotheses, maximum likelihood hypotheses for predicting probabilities, minimum description length principle, Bayes optimal classifier, Gibs algorithm, Na'ive Bayes classifier, an example: learning to classify text, Bayesian belief networks, the EM algorithm. Computational learning theory - Introduction, probably learning an approximately correct hypothesis, sample complexity for finite hypothesis space, sample complexity for infinite hypothesis spaces, the mistake bound model of learning.
Instance-Based Leaming- Introduction, k-nearest neighbour algorithm, locally weighted regression, radial basis functions, case-based reasoning, remarks on lazy and eager learning

UNIT IV	Lecture Hrs:10

Genetic Algorithms - Motivation, Genetic algorithms, an illustrative example, hypothesis space search, genetic programming, models of evolution and learning, parallelizing genetic algorithms.
Leaming Sets of Rules - Introduction, sequential covering algorithms, learning rule sets: summary, learning First-Order rules, learning sets of First-Order rules: FOIL, Induction asinverted deduction, inverting resolution.
Reinforcement Leaming - Introduction, the learning task, Q-leaming, non-deterministic, rewards and actions, temporal difference learning, generalizing from examples, relationship to dynamic programmmg.

UNIT V	**Lecture Hrs:10**

Analytical Learning-I- Introduction, learning with perfect domain theories: PROLOG-EBG, remarks on explanation-based learning, explanation-based learning of search control knowledge.
Analytical Leaming-2-Using prior knowledge to alter the search objective, using prior knowledge to augment search operators.
Combining Inductive and Analytical Learning - Motivation, inductive-analytical approaches to learning, using prior knowledge to initialize the hypothesis.

Text Books:

1.Machine Leaming - Tom M. Mitchell, - MGH
2. Machine Learning, SaikatDutt, Subramanian Chandramouli, Amit Kumar Das, Pearson, 2019.

Reference books:

1. Artificial neural networks - by Yegnanarayana PHI Publications
2. Neural networks, fuzzy logic, and genetic algorithms : Synthesis and Applications - By S. Rajasekaran, G. A. Vijayalakshmi Pai **.**

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Course Code	MOBILE APPLICATION DEVELOPMENT	L	T	P	C
23MCT305a		3	0	0	3
Semester				III	

Course Objectives:

1. To demonstrate their understanding of the fundamentals of Android operating systems
2. To improves their skills of using Android software development tools
3. To demonstrate their ability to develop software with reasonable complexity on mobile platform
4. To demonstrate their ability to deploy software to mobile devices
5. To demonstrate their ability to debug programs running on mobile devices

Course Outcomes (CO):

After completion of the course, student will be able to,
CO1: Understand the working of Android OS Practically.
CO2: Develop Android user interfaces
CO3: Gain knowledge on Intents and Broadcasts.
CO4: Develop, deploy and maintain the Android Applications.
CO5: Understand SQLite Database.

UNIT-I	Lecture Hrs:12

Introduction to Android Operating System: Android OS design and Features - Android development framework, SDK features, Installing and running applications on Android Studio, Creating AVDs, Types of Android applications, Best practices in Android programmmg, Android tools Android application components - Android Manifest file, Externalizing resources like values, themes, layouts, Menus etc, Resources for different devices and languages, Runtime Configuration Changes, Android Application Lifecycle -
Activities, Activity lifecycle, activity states, monitoring state changes.

UNIT-II	Lecture Hrs:12

Android User Interface: Measurements - Device and pixel density independent measuring units, Layouts - Linear, Relative, Grid and Table Layouts, User Interface (UI) Components - Editable and non-editable Text Views, Buttons, Radio and Toggle Buttons, Checkboxes, Spinners, Dialog and pickers Event Handling - Handling clicks or changes of various UI components Fragments - Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity,adding, removing and replacing fragments with fragmenttransactions, interfacing between fragments and Activities, Multi-screen Activities

UNIT III	Lecture Hrs:10

Intents and Broadcasts: Intent - Using intents to launch Activities, Explicitly starting new Activity, Implicit Intents, Passing data to Intents, Getting results from Activities, Native Actions, using Intent to dial a number or to send SMS Broadcast Receivers - Using Intent filters to service implicit Intents, Resolving Intent filters, finding and using Intents received within an Activity Notifications - Creating and Displaying notifications, Displaying Toasts

UNIT IV	Lecture Hrs:10

Persistent Storage: Files - Using application specific folders and files, creating files, reading data from files, listing contents of a directory Shared Preferences - Creating shared preferences, saving and retrieving data using Shared Preference

UNIT V	Lecture Hrs:10

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Database - Introduction to SQLite database, creating and opening a database, creating tables, inserting retrieving and etindelg data, Registering Content Providers, using content Providers (insert, delete, retrieve and update).
Text Books: 1.Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox)2012 2.Android Application Development for Java Programmers, James C Sheusi, Cengage Leaming, 2013

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Course Code	INTERNET OF THINGS	L	T	P	C
23MCT305b		3	0	0	3
Semester					III

Course Objectives:

1. Introduce the fundamental concepts of IoT and physical computing
2. Expose the student to a variety of embedded boards and IoT Platforms
3. Create a basic understanding of the communication protocols in IoT communications.
4. Familiarize the student with application program interfaces for IoT.
5. Enable students to create simple IoT applications.

Course Outcomes (CO):

After completion of the course, student will be able to,
CO1: Choose the sensors and actuators for an IoT application
CO2: Select protocols for a specific IoT application
CO3: Utilize the cloud platform and APIs for IoT applications
CO4: Experiment with embedded boards for creating IoT prototypes
CO5: Design a solution for a given IoT application, Establish a startup.

UNIT-I	Lecture Hrs:12

Overview of loT:
The Internet of Things: An Overview, The Flavor of the Internet of Things, The "Internet" of "Things", The Technology of the Internet of Things, Enchanted Objects, Who is Making the Internet of Things?
Design Principles for Connected Devices: Calm and Ambient Technology, Privacy, Web Thinking for Connected Devices, Affordances.
Prototyping: Sketching, Familiarity, Costs Vs Ease of Prototyping, Prototypes and Production, Open source Vs Close source, Tapping into the community.

UNIT-II	Lecture Hrs:10

Embedded Devices:
Electronics, Embedded Computing Basics, Arduino, Raspberry Pi, Mobile phones and tablets, Plug Computing: Always-on Internet of Things

UNIT III	Lecture Hrs:10

Communication in the IoT:
Internet Communications: An Overview, IP Addresses, MAC Addresses, TCP and UDP Application Layer Protocols.
Prototyping Online Components: Getting Started with an API, Writing a New API, Real-Time Reactions, Other Protocols Protocol.

UNIT IV	Lecture Hrs:10

Business Models: A short history of business models, The business model canvas, Who is the business model for, Models, Funding an Internet of Things startup, Lean Startups.
Manufacturing: What are you producing, Designing kits, Designing printed circuit boards.

UNIT V	Lecture Hrs:10

Manufacturing continued: Manufacturing printed circuit boards, Mass-producing the case and other fixtures, Certification, Costs, Scaling up software.
Ethics: Characterizing the Internet of Things, Privacy, Control, Environment, Solutions.

Text Books:

1. Adrian McEwen, Hakim Cassimally - Designing the Internet of Things, Wiley Publications, 2012

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Course Code	BLOCK CHAIN TECHNOLOGIES	L	T	P	C
23MCT305c		3	0	0	3
Semester					III

Course Objectives:

This course is intended to study the basics of Block chain technology. During this course learner will explore various aspects of Block chain technology like application in various domains. By implementing learner will have idea about private and public Block chain, and smart contract.

Course Outcomes (CO):

After completion of the course, student will be able to,

CO1: Understand and explore the working of Block chain technology.

CO2: Analyze the working of Smart Contracts.

CO3: Gain knowledge on the working of Ethereum.

CO4: Understand and analyze the working of Hyper ledger.

CO5:Apply the learning of solidity and de-centralized apps on Ethereum.

UNIT-I	Lecture Hrs:12

Introduction of Cryptography and Block chain: What is Block chain, Block chain Technology Mechanisms &Networks, Block chain Origins, Objective of Block chain, Block chain Challenges, Transactions And Blocks, P2P Systems, Keys As Identity, Digital Signatures, Hashing, and public key cryptosystems, private vs. public Block chain

UNIT-II	Lecture Hrs:12

Bit Coin and Crypto currency: What is Bitcoin, The Bitcoin Network, The Bitcoin Mining Process, Mining Developments, Bitcoin Wallets, Decentralization and Hard Forks, Ethereum Virtual Machine (EVM), Merkle Tree, Double-Spend Problem, Blockchain and Digital Currency, Transactional Blocks, Impact Of Block chain Technology On Crypto currency.

UNIT III	Lecture Hrs:10

Introduction to Ethereum: What is Ethereum, Introduction to Ethereum, Consensus Mechanisms, How Smart Contracts Work, Metamask Setup, Ethereum Accounts, Receiving Ether's What's a Transaction?, Smart Contracts.

UNIT IV	Lecture Hrs:10

Introduction to Hyper ledger: What is Hyper ledger? Distributed Ledger Technology & its Challenges, Hyper ledger & Distributed Ledger Technology, Hyper ledger Fabric, Hyper ledger Composer.

UNIT V	Lecture Hrs:10

Block chain Applications: Internet of Things, Medical Record Management System, Domain Name Service and Future of Block chain, Alt Coins.

Text Books:

1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven
2. Goldfeder, Bitcoin and Cryptocurrency Technologies: A Comprehensive
3. Introduction, Princeton University Press (July 19, 2016).
4. Antonopoulos, Mastering Bitcoin.
5. Antonopoulos and G. Wood, Mastering Ethereum.
6. D. Drescher, Blockchain Basics. A press, 2017.

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Course Code		L	T	P	C
23MCP301	WEB TECHNOLOGIES LABORATORY	0	0	4	2
Semester				III	

Course Objectives:

1. Understand the web technologies to create adaptive web pages for web application.
2. Use CSS to implement a variety of presentation effects to the web application
3. Know the concept and implementation of cookies as well as related privacy concerns
4. Develop a sophisticated web application that employs the MVC architecture

Course Outcomes (CO):

After completion of the course, student will be able to,

CO1: Integrate frontend and backend web technologies in distributed systems.
CO2: Facilitate interface between frontend and backend of a web application.
CO3: Debug, test and deploy web applications in different web servers.
CO4: Migrate the web applications to the other platforms like .Net

List of Experiments:

1. Write a PHP script to print prime numbers between 1-50.
2. PHP script to
   a) Find the length of a string.
   b) Count no of words in a string.
   c) Reverse a string.
   d) Search for a specific string.
3. Write a PHP script to merge two arrays and sort them as numbers, in descending order.
4. Write a PHP script that reads data from one file and write into another file.
5. Develop static pages (using Only HTML) of an online book store. The pages should resemble: www.amazon.com. The website should consist the following pages.
   a) Home page
   b) Registration and user Login
   c) User Profile Page
   d) Books catalog
   e) Shopping Cart
   f) Payment By credit card
   g) Order Conformation
6. Validate the Registration, user login, user profile and payment by credit card pages using JavaScript.
7. Create and save an XML document on the server, which contains 10 users information. Write a program, which takes User Id as an input and returns the user details by taking the user information from the XML document.
8. Install TOMCAT web server. Convert the static web pages of assignments 2 into dynamic web pages using servlets and cookies. Hint: Users information (user id, password, credit card number) would be stored in web.xml. Each user should have a separate Shopping Cart.
9. Redo the previous task using JSP by converting the static web pages of assignments 2 into dynamic web pages. Create a database with user information and books information. The books catalogue should be dynamically loaded from the database. Follow the MVC architecture while doing the website.

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Course Code	BIG DATA TECHNOLOGIES LABORATORY	L	T	P	C
23MCP302		0	1	2	2
Semester				III	

Course Objectives:

1. Apply quantitative modeling and data analysis techniques to the solution of real-world business problems, communicate findings, and effectively present results using data visualization techniques.
2. Apply principles of Data Science to the analysis of business problems.

Course Outcomes (CO):

After completion of the course, student will be able to,

CO1: Understand and implement the basics of data structures like Linked list, stack, queue, set and map in Java.

Demonstrate the knowledge of big data analytics and implement different file management taskin Hadoop.

CO2: Understand Map Reduce Paradigm and develop data applications using variety of systems.

CO3: Analyze and perform different operations on data using Pig Latin scripts.

CO4: Illustrate and apply different operations on relations and databases using Hive.

List of Experiments:

Week 1: Hadoop Installation on a)Single Node and SPARK Installation, Launch a cloud instance for AWS instance on Centos 7

Week 2: Design a distributed application using MapReduce which processes a log file of a system. List out the users who have logged for maximum period on the system. Use simple log file from the Internet and process it using a pseudo distribution mode on Hadoop platform.

Week 3: Design and develop a distributed application to find the coolest/hottest year from the available weather data. Use weather data from the Internet and process it using MapReduce.

Week 4: Write an application using HBase and HiveQL for flight information system which will include 1) Creating, Dropping, and altering Database tables, 2) Creating an external Hive table to connect to the HBase for Customer Information Table, 3) Load table with data, insert new values and field in the table, Join tables with Hive, 4) Create index on Flight information Table, and 5) Find the average departure delay per day in 2008.

Week 5: Display the hierarchical structure of your data by generating Trees, graphs and network visualization. Install and Run Pig then write Pig Latin scripts to sort, group, join, project and filter the data. Install and Run Hive then use Hive to Create, alter and drop databases, tables, views, functions and Indexes.

Week 6: Input file contains a series of tweets made by few people. Do a word count on the text object value Hint: Json Parsing in python - this sample snippet can be used within Map to read the JSON

Week 7: Reading different types of data sets (.txt, .csv) from web and disk and writing in file in specific disk location. And Reading Excel,XML data sheets in R. Using with and without R

objects on console, mathematical functions on console create R objects for calculator application and save in a specified location in disk.
Write an R script to find basic descriptive statistics using summary,str, quartile unction on mtcars & cars datasets and to find subset of dataset by using subset (),aggregate () functions on dataset.

Week 8:
Implementing data visualization using R : Find the data distributions using box and scatter plot, Find the outliers using plot and Plot the histogram, bar chart and pie chart on sample data.

MASTER OF COMPUTER APPLICATIONS R23

Course Code	DEV OPS & AGILE PROGRAMMING	L	T	P	C
23MCP303	LABORATORY	0	1	2	2
Semester				III	

Course Objectives:

1. To understand the concept of DevOps with associated technologies and methodologies.
2. To be familiarized with Jenkins, which is used to build & test software Applications & Continuous integration in Devops environment.
3. To understand different Version Control tools like GIT, CVS or Mercurial
4. To understand Docker to build, ship and run containerized images
5. To use Docker to deploy and manage Software applications running on Container.
6. To be familiarized with concept of Software Configuration Management & provisioning using tools like Puppet, Chef, Ansible or Saltstack.

Course Outcomes (CO):

After completion of the course, student will be able to,

CO1: Understand and Implement the Integration and Continuous deployment.

CO2: Can implement anatomy of continuous delivery pipeline.

CO3: Understands and implement static code analysis.

List of Experiments:

Agile Laboratory Programs:

1. Understand the background and driving forces for taking an Agile Approach to Software Development.
2. Understand the business value of adopting agile approach.
3. Understand agile development practices
4. Drive Development with Unit Test using Test Driven development.
5. Apply Design principle and Refactoring to achieve agility
6. To study automated build tool.
7. To study version control tool.
8. To study Continuous Integration tool.
9. Perform Testing activities within an agile project.

Dev Ops Laboratory Programs:

1. Build & Test Applications with Continuous integration - To Install and Configure Jenkins to test, and deploy Java or Web Applications using NetBeans or eclipse.
2. Version Control - To Perform Version Control on websites/Software's using different Version control t ools like RCS/ CVS/GIT/Mercurial (Any two)
3. Virtualization & Containerization - To Install and Configure Docker for creating Containers of different Operating System images.
4. Virtualization & Containerization - To Build, deploy and manage web or Java application on Docker
5. Software Configuration Management - To install and configure Software Configuration Management using Chef/Puppet/Ansible or Saltstack.
6. Provisioning – To Perform Software Configuration Management and Provisioning using Chef/Puppet/Ansible or Saltstack.

MASTER OF COMPUTER APPLICATIONS R23

Course Code	FULL STACK DEVELOPMENT	L	T	P	C
23MCP305		1	0	2	2
Semester				III	

Course Objectives:

1. Get familiar with web design using HTML and CSS
2. Understand the concepts on Bootstrap framework and JavaScript
3. Identify the working methodologies on Angular JS concepts
4. Get familiarity with Node JS techniques
5. Gain the knowledge about database connectivity for web application development

Course Outcomes (CO):

After completion of the course, student will be able to,
CO1: Write HTML and CSS scripts to design web pages.
CO2: Implement JavaScript methodologies while designing web pages
CO3: Design web pages using Angular JS techniques
CO4: Implement Node JS concepts in web development
CO5: Develop web sites using Node JS with database connectivity

UNIT-I	Lecture Hrs:10

HTML Basics HTML Elements --HTML Attributes - HTML Formatting - HTML Links and Images HTML Lists, HTML tables – Frames and Framesets - Blocks, Classes - HTML Layout and Forms. CSS: Introduction CSS3 - CSS3Colours - Backgrounds, Borders, Padding, Height/Width - CSS3 Gradients, Shadows - CSS3 Text, Fonts - CSS3 2D &3D Transforms - CSS Links – CSS Lists & Tables - CSS Box Model, Outline, Display, Max-width, Position - CSS Float, Inline-block – CSS Align – CSS Pseudo-class, Pseudo-element - CSS Navigation, Dropdowns, Tooltips, Images – CSS Selectors - CSS Forms, Buttons - CSS3 Multiple Columns -
CSS3 User Interface: Box Sizing, Filters – Menu creation -Responsive CSS

UNIT-II	Lecture Hrs:10

Introduction to Bootstrap - Bootstrap Basics - Bootstrap Grids - Bootstrap Themes – Bootstrap with CSS Introduction to JavaScript - Java Script Language Basics -Scope - JavaScript Events - Strings JavaScript Math - Arrays – Boolean – Comparisons - JavaScript Loops & Decisions - JavaScript objects and Method - JavaScript Errors - Debugging - JavaScript Functions - JavaScript Forms - JavaScript DOM

UNIT III	Lecture Hrs:10

Introduction – Features of Angular JS – Angular Expressions – Directives – Controllers – Modules – Forms – Dependency Injection and Services – Angular JS Animations.

UNIT IV	Lecture Hrs:10

Stream Data Model and Architecture - Data Stream Management Systems – Data Stream Mining and Examples of Data Stream Applications - Mining Time Series Data –Stream Queries – Issues in Data Stream Query Processing – Sampling in Data Streams –Filtering Streams – Counting Distinct Elements in a Stream. Counting Ones in a Window

UNIT V	Lecture Hrs:10

Overview of Database Queries – Connecting String – Configuring Node JS – Working with select Command – Updating Records – Deleting Records –MERN STACK - Project Development Using Node JS.

Text Books:

1. 1.HTML & CSS: The Complete Reference, Fifth Edition, Thomas Powell, McGrawHill

2. Complete Bootstrap: Responsive Web Development with Bootstrap 4, Matt Lambert,Bass Johnson, David Cochran, Ian Whitley, PACKT publishing
3. Javascript for Dummies, Emily Vander Veer, Wiley Publishing, 4th Edition
4. Learning Angular JS, Ken Williamson, O.Reilly, 2015 5. Beginning Node JS, Basarath Ali Syed, Apress, 2014

Reference Books:

1. Complete Bootstrap: Responsive Web Development with Bootstrap 4, Matt Lambert,Bass Johnson, David Cochran, Ian Whitley, PACKT publishing
2. Mastering Javascript, VedAntani, PACKT publishing, 2016
3. Node JS Web Development, David Herron, PACKT publishing, 2016

MASTER OF COMPUTER APPLICATIONS R23

Course Code	DEEP LEARNING	L	T	P	C
23MCT401a		3	0	0	3
Semester				IV	

Course Objectives:

1. To present the mathematical, statistical and computational challenges of building neural networks.
2. To teach the concepts of deep learning.
3. To introduce dimensionality reduction techniques.
4. To enable the students to know deep learning techniques to support real-time applications.
5. To explain the case studies of deep learning techniques.

Course Outcomes (CO):

After completion of the course, student will be able to,

CO1: Identify Convolutional Neural Networks models to solve Supervised Learning Problems

CO2: Design Auto encoders to solve Unsupervised Learning problems

CO3:Understand the Convet and the architecture of AlexNet

CO4: Apply Long Shot Term Memory (LSTM) Networks for time series analysis classification problems.

CO5: Apply Classical Supervised Tasks for Image Denoising, Segmentation and Object detection problems

UNIT-I	Lecture Hrs:12

Introduction: Introduction to machine learning- Linear models (SVMs and Perceptron, logistic regression)-

Intro to Neural Nets: What a shallow network computes- Training a network: loss functions, back propagation and stochastic gradient descent- Neural networks as universal function approximates.

UNIT-II	Lecture Hrs:12

Deep Networks: History of Deep Learning- A Probabilistic Theory of Deep Learning- Back propagation and regularization, batch normalization- VC Dimension and Neural Nets-Deep Vs Shallow Networks Convolutional Networks - Generative Adversarial Networks (GAN), Semi- supervised Learning.

UNIT III	Lecture Hrs:10

Dimensionality Reduction: Linear (PCA, LDA) and manifolds, metric learning - Auto encoders and dimensionality reduction in networks - Introduction to Convnet - Architectures - AlexNet, VGG, Inception, ResNet - Training a Convnet: weights initialization, batch normalization, hyper parameter optimization

UNIT IV	Lecture Hrs:10

Optimization and Generalization: Optimization in deep learning- Non-convex optimization for deep networks- Stochastic Optimization Generalization in neural networks- Spatial Transformer Networks- Recurrent networks, LSTM - Recurrent Neural Network Language Models- Word-Level RNNs & Deep Reinforcement Learning - Computational & Artificial Neuroscience.

UNIT V	Lecture Hrs:10

Case Study and Applications: Image net- Detection-Audio Wave Net-Natural Language Processing Word2Vec - Joint Detection Bioinformatics- Face Recognition- Scene Understanding- Gathering Image Captions.

Text Books:

1. Deep Learning", Ian Good fellow, Yoshua Bengio, Aaron Courville, MIT Press 2016.
2. "Neural Networks and Deep Learning A Text Book", Charu C Aggarwal, Springer International Publishing AG, Part of Springer Nature 2018.

MASTER OF COMPUTER APPLICATIONS R23

Course Code	SOCIAL MEDIA ANALYSIS	L	T	P	C
23MCT401b		3	0	0	3
Semester				IV	

Course Objectives:

1. To inspire the students with interest, excitement, and urge to learn the subject of Socialnetwork analysis
2. To understand the fundamental concepts of Social network analysis.
3. To introduce the purpose of learning important aspects in Social network analysis.

Course Outcomes (CO):

After completion of the course, student will be able to,

CO1: Explain basic concepts and theories of network analysis in the social sciences, and understand how these concepts and theories can help explain different actors' micro behaviors as well as macro outcomes

CO2: Critically examine the ways in which networks can contribute to the explanation of social, political, economic and cultural phenomena;

CO3: Use statistical software to visualize networks and analyse their properties, connecting these to network concepts and theories;

CO4: Explain principles underlying statistical models for social networks;

CO5: Use software to implement statistical models of social networks to analyse network formation and evolution & Use software to simulate the dynamics of networks based on social network models.

UNIT-I	Lecture Hrs:10

Introduction to Web - Limitations of current Web - Development of Semantic Web - Emergence of the Social Web - Network analysis -Development of Social Network Analysis - Key concepts and measures in network analysis - Electronic sources for network analysis -Electronic discussion networks, Blogs and online communities, Web-based networks - Applications of Social Network Analysis

UNIT-II	Lecture Hrs:10

Ontology and their role in the Semantic Web - Ontology-based Knowledge Representation - Ontology languages for the Semantic Web -RDF and OWL - Modelling and aggregating social network data - State-of-the-art in network data representation, Ontological representation of social individuals - Ontological representation of social relationships, Aggregating and reasoning with social network data, Advanced Representations

UNIT III	Lecture Hrs:10

Extracting evolution of Web Community from a Series of Web Archive - Detecting Communities in Social Networks - Definition of Community - Evaluating Communities - Methods for Community Detection & Mining -Applications of Community Mining Algorithms- Tools for Detecting Communities Social Network Infrastructures and Communities-Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions

UNIT IV	Lecture Hrs:09

Understanding and Predicting Human Behavior for Social Communities - User Data Management, Inference and Distribution- Enabling New Human Experiences - Reality Mining Context-Awareness - Privacy in Online Social Networks

MASTER OF COMPUTER APPLICATIONS R23

UNIT V	Lecture Hrs:09

Trust in Online Environment - Trust Models Based on Subjective Logic - Trust Network Analysis - Trust Transitivity Analysis -Combining Trust and Reputation - Trust Derivation Based on Trust Comparisons - Attack Spectrum and Counter measures

Textbooks:

1. Charu C. Aggarwal, "Social Network Data Analytics", Springer, 2011.
2. GuandongXu ,Yanchun Zhang and Lin Li, "Web Mining and Social Networking Techniques and applications", Springer, first edition, 2011.

Reference Books:

1. Peter Mika, "Social networks and the Semantic Web", Springer, first edition 2007.
2. BorkoFurht, "Handbook of Social Network Technologies and Applications", Springer, first edition, 2010.
3. Dion Goh and Schubert Foo, "Social information retrieval systems: emerging technologies and applications for searching the Web effectively", IGI Global snippet, 2008. 133
4. Max Chevalier, Christine Julien and Chantal Soule-Dupuy, "Collaborative and social information retrieval and access: techniques for improved user modelling", IGI Global snippet, 2004.

Online Learning Resources:

1. www.utdallas.edu
2. ibook.ics.uci.edu
3. www.ebmtools.org

Course Code	MULTIMEDIA SYSTEMS & TOOLS	L	T	P	C
23MCT401c		3	0	0	3
Semester				IV	

Course Objectives:

1. Formulate a working definition of interactive multimedia
2. Demonstrate competence in using the authoring program Hyper Studio
3. Outline the use of animation, digitized sound, video control, and scanned images
4. Illustrate the use of Netscape to access the Course Home Page and Tips and Tricks;

Course Outcomes (CO):

After completion of the course, student will be able to,

CO1: Create a well-designed, interactive Web site with respect to current standards and practices

CO2: Demonstrate in-depth knowledge in an industry-standard multimedia developmenttool and its associated scripting language.

CO3: Determine the appropriate use of interactive verses standalone Web applications

CO4: Create time-based and interactive multimedia components

CO5: Identify issues and obstacles encountered by Web authors in deploying Web-based Applications

UNIT-I	Lecture Hrs:10

Multimedia Overview, Definition Applications and Design, Authoring (Hyper Studio), Introduction to Hyper Studio, The Metaphor, The Basics (Cards, Buttons, Text), Hyper Studio, Resources.

Multimedia Authoring- Multimedia Authoring Metaphors, Multimedia Production, Multimedia Presentation, Automatic Authoring, Some Useful Editing and Authoring Tools, Adobe Premiere, Macromedia Director, Macromedia Flash, Dreamweaver.

UNIT-II	Lecture Hrs:10

Instructional Design, Objectives, Content (print, graphics, sounds, etc.), Interaction, Assessment, Closure, Screen Design: Metaphors and Themes, Colors and Backgrounds, Text (size, color, placement), Navigation, Consistency.

UNIT III	Lecture Hrs:10

Transitions and Links, Use of Sound, HyperStudio Sounds, Recording Your Own, Internet Resources, Graphics, Integrating Web documents, HyperStudio Tips and Tricks, Animation, Launching other applications and documents

UNIT IV	Lecture Hrs:09

Understanding and Predicting Human Behavior for Social Communities - User Data Management, Inference and Distribution- Enabling New Human Experiences - Reality Mining Context-Awareness - Privacy in Online Social Networks

UNIT V	Lecture Hrs:09

Incorporating Digital Media, QuickTime Movies, Laserdisc and CD-ROM control, scanning.

Textbooks:

1. Marcia Kuperberg, A Guide to Computer Animation: for TV, games, multimedia and web,Focal Press (Taylor and Francis Group), 2002.
2. Z. N. Li and M. S. Drew, "Fundamentals of Multimedia", Pearson Prentice Hall

Course Code	CYBERLAWS	L	T	P	C
23MCT402a		3	0	0	3
Semester				IV	

Course Objectives:

1. The objectives of this course are to enable the learner to understand, explore, and acquire a critical understanding of cyber laws.
2. Equip the learner with competencies for dealing with frauds and deceptions, and other cybercrimes that take place via the Internet.

Course Outcomes (CO):

After completion of the course, student will be able to,

CO1: Gain knowledge on cyber law and the legal challenges related to cyberspace.
CO2: Understand the policy regulations of cyber space employed by various countries
CO3: Understand the social and intellectual property issues emerging from cyberspace.
CO4: Understand the relationship between commerce and cyberspace.
CO5: Gain the knowledge of information Technology Act.

UNIT-I	Lecture Hrs:10
Conceptual and theoretical perspective of Cyber Law, Computer and Web Technology, Development of Cyber Law, National and International Perspective Cyber Law, Legal issues and challenges in India, USA, Data Protection, Cyber Security.	
UNIT-II	**Lecture Hrs:10**
Jurisdiction issues in Transactional Crimes Cyber Law, International Perspective, Budapest Convention on Cybercrime. Hacking and Legal Issues, Privacy legal issues.	
UNIT III	**Lecture Hrs:10**
Cyber Law and IPR, Understanding Copyright in Information Technology, Software Copyrights Copyright in Internet & Multimedia, Software Piracy, Trademarks in Internet Domain Name registration, Domain Name disputes, Icann's core principles and domain names, Net Neutrality,Databases in IT, Protection of databases, Position in USA, EU and India.	
UNIT IV	**Lecture Hrs:09**
E-Commerce, UNCITRAL Model, Legal Aspects of E-Commerce, E-Taxation, E-Banking, Online Publishing and online credit card payment, Employment Contracts, Non-Disclosure Agreements.	
UNIT V	**Lecture Hrs:09**
Information Technology Act 2000, Aims and Objectives, Overview of the Act, Jurisdiction, Electronic Governance, Electronic Evidence, Digital Signature Certificates, Digital Signatures, Duties of Subscribers, Role of Certifying Authorities, Regulations Appellate Tribunal, Internet Service Providers and their liabilities, Social Networking Sites.	

Textbooks:

1. Law Relating to Computer, Internet and E-Commerce by KamathNandan, 5th Edition, Universal Law Publishing.

Course Code	ENTREPRENEURSHIP	L	T	P	C
23MCT402b		3	0	0	3
Semester				IV	

Course Objectives:

1. The aim of this course is to have a comprehensive perspective of inclusive learning, ability to learn and implement the fundamentals of Entrepreneurship.

Course Outcomes (CO):

After completion of the course, student will be able to,

CO1: Learn the basics of Entrepreneurship and entrepreneurial development which will help them toprovide vision for their own Start-up.

CO2: Undertake new business ventures with new creative business plan models, contents and effective presentation of business plan.

CO3:To apply various strategies for decisions under different scenarios to reduce risk.

CO4:Analyse challenges faced by Women entrepreneurship focusing on Rural Entrepreneurs

CO5:Know the need of Entrepreneurship Development Programmes (EDPs) to transform as entrepreneur with case studies.

UNIT-I	Lecture Hrs:10

Entrepreneurial Perspectives

Introduction to Entrepreneurship - Evolution - Concept of Entrepreneurship - Types of Entrepreneurs - Entrepreneurial Competencies, Capacity Building for Entrepreneurs. Entrepreneurial Training Methods - Entrepreneurial Motivations - Models for Entrepreneurial Development - The process of Entrepreneurial Development

UNIT-II	Lecture Hrs:10

New Venture Creation

Introduction, Mobility of Entrepreneurs, Models for Opportunity Evaluation; Business plans - Purpose, Contents, Presenting Business Plan, Procedure for setting up Enterprises, Central level - Startup and State level - T Hub, Other Institutions initiatives.

UNIT III	Lecture Hrs:10

Management of MSMEs and Sick Enterprises

Challenges of MSMEs, Preventing Sickness in Enterprises - Specific Management Problems; Industrial Sickness; Industrial Sickness in India - Symptoms, process and Rehabilitation of Sick Units

UNIT IV	Lecture Hrs:09

Managing Marketing and Growth of Enterprises

Essential Marketing Mix of Services, Key Success Factors in Service Marketing, Cost and Pricing,Branding, New Techniques in Marketing, International Trade.

UNIT V	Lecture Hrs:09

Strategic perspectives in Entrepreneurship

Strategic Growth in Entrepreneurship, The Valuation Challenge in Entrepreneurship, The Final Harvest of New Ventures, Technology, Business Incubation, India way- Entrepreneurship; Women Entrepreneurs - Strategies to develop Women Entrepreneurs, Institutions supporting Women Entrepreneurship in India.

Textbooks:

1. Entrepreneurship Development and Small Business Enterprises, Poornima M.Charantimath, 2nd edition, Pearson, 2014.
2. Entrepreneurship, a South - Asian Perspective, D.F.Kuratko and T.V.Rao, 3rd

edition, Cengage, 2012.
3. Entrepreneurship, Arya Kumar, 4th edition, Pearson 2015.

Course Code	NOSQL DATABASES	L	T	P	C
23MCT402c		3	0	0	3
Semester				IV	

Course Objectives:

1. Distinguish the different types of NoSQL databases. Understand the impact of the cluster ondatabase design. State the CAP theorem and explain it main points.

Course Outcomes (CO):

After completion of the course, student will be able to,

CO1: Define, compare and use the four types of NoSQL Databases (Document-oriented, Key Value Pairs, Column-oriented and Graph).

CO2: Demonstrate an understanding of the detailed architecture, define objects, load data, query data and.

CO3: Explain the detailed architecture, define objects, load data, query data and performance tuneDocument-oriented NoSQL databases.

CO4:Understand performance tune Column-oriented NoSQL databases .

CO5:Gain knowledge on NoSQL Key-value databases.

UNIT-I	Lecture Hrs:10

Define, compare and use the four types of NoSQL Databases (Document-oriented, KeyValue Pairs,Column-oriented and Graph).

• Demonstrate an understanding of the detailed architecture, define objects, load data, query data andperformance tune Column-oriented NoSQL databases.

Explain the detailed architecture, define objects, load data, query data and performance tune Document-oriented NoSQL databases

UNIT-II	Lecture Hrs:10

Comparison of relational databases to new NoSQL stores, MongoDB, Cassandra, HBASE, Neo4j use and deployment, Application, RDBMS approach, Challenges NoSQL approach, Key-Value and Document Data Models, Column-Family Stores, Aggregate-Oriented Databases

UNIT III	Lecture Hrs:10

Replication and sharding, Map Reduce on databases. Distribution Models, Single Server, Sharding, Master- Slave Replication, Peer-to-Peer Replication, Combining Sharding and Replication. NoSQL Key Value databases using MongoDB, Document Databases, What Is a Document Database? Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases, Event Logging, Content Management Systems, Blogging Platforms, Web Analytics or Real-Time Analytics, E-Commerce Applications, When Not to Use, Complex Transactions Spanning Different Operations, Queries against Varying Aggregate Structure.

UNIT IV	Lecture Hrs:09

Column- oriented NoSQL databases using Apache HBASE, Column-oriented NoSQL databases using Apache Cassandra, Architecture of HBASE, What Is a Column-Family Data Store? Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases, Event Logging, Content Management Systems, Blogging Platforms, Counters, Expiring Usage, When Not to Use.

UNIT V	Lecture Hrs:09

NoSQL Key/Value databases using Riak, Key-Value Databases, What Is a Key-Value Store, Key-Value Store Features, Consistency, Transactions, Query Features, Structure of Data, Scaling,

Suitable Use Cases, Storing Session Information, User Profiles, Preferences, Shopping Cart Data, When Not to Use, Relationships among Data, Multi operation Transactions, Query by Data, Operations by Sets.
Textbooks: - 1. NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence Sadalage, P. &FowlerPearson Education